

Bioreactor and Fermenter: Role in Pharmaceutical and other applications

By

GENESIS TECHNOLOGIES

The purpose of the fermenter / bioreactor is to provide a contained, controlled, aseptic and homogeneous environment in which fermentation can be performed safely and practically to achieve the desired objectives. Microbial fermentation involves transformation of organic compounds used in food, pharmaceuticals and fragrance industries. Microbes have commercially exploited to obtain several important products like primary metabolites, secondary metabolites, penicillins, vaccines, gums and even transformed products in large-scale Fermenters.

Biotransformed products:

Microorganisms have the ability to biotransform compounds quickly. Stereospecific reduction, oxidation, dehydration, amination, pharmacological properties are few examples.

The production of vinegar is an example of the biotransformations of steroids, terpenoids, antibiotics and polysaccharides.

Plant cell bioreactor

Like microbes plant cell can be used for the production of

- Pharmaceuticals products like codeine, scopolamine, vincristine and digoxin
- Chemicals : Pyrethrin, sialanin, rotenone and other allopathic chemicals

Animal Cell Bioreactor

The critical aspect of the mammalian cell bioreactor is the provision of O₂. This is done by membrane aeration so as to avoid cellular damage.

Some of the important products are erythropoietin, factor VIII, monoclonal antibodies, tertiary vaccine, human vaccine and growth hormones etc.,

Microbial biomass

The production of yeast and production of single cell protein are the best example of biomass production.

Organic solvents

Acetone, butanol, ethanol and amyl alcohol

Foods beverages

Wine, beer, cheese, fermented milk, pickles, yeast and vinegar.

Organic acids and amino acids

Lactic, citric, acetic, gluconic, butyric, L – Glutamic acid and L – lysine

Vitamins and Growth Stimulants

B12, riboflavin, Vitamin A and Gibberellins.

Enzymes

Amylases, protease, pectinases and invertase.

Flavoring agents

Monosodium glutamate and nucleotides